Oct. 26, 1954 E. ROGNER 2,692,474

CARRIER FOR BAND-TENSIONING PULLEYS

Filed Oct. 26, 1950 3 Sheets-Sheet 1

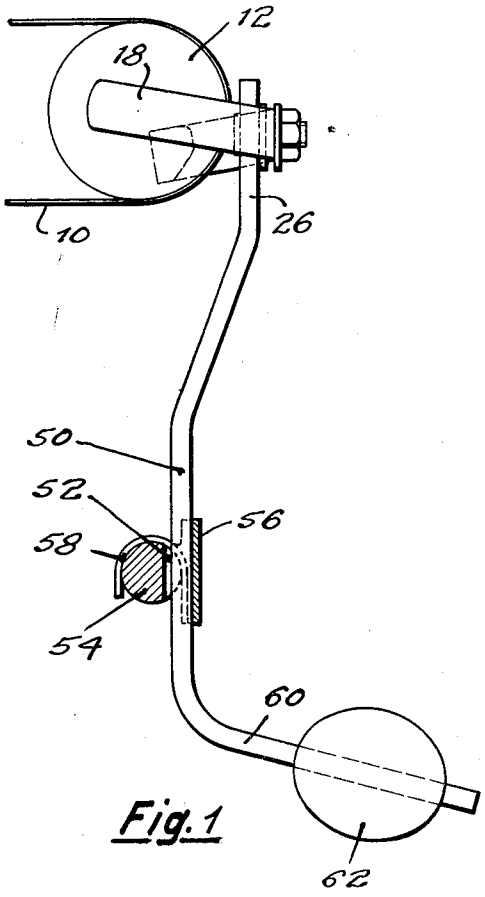


Fig. 1

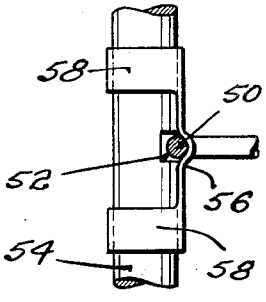


Fig. 2

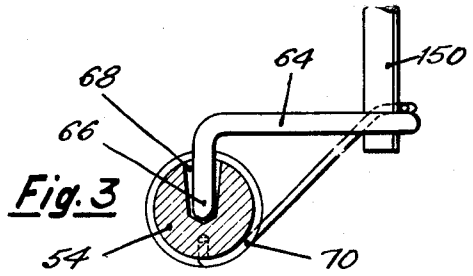


Fig. 3

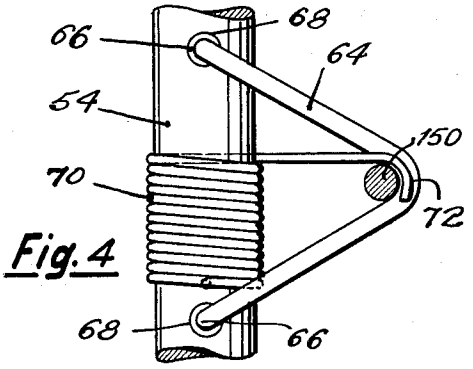


Fig. 4

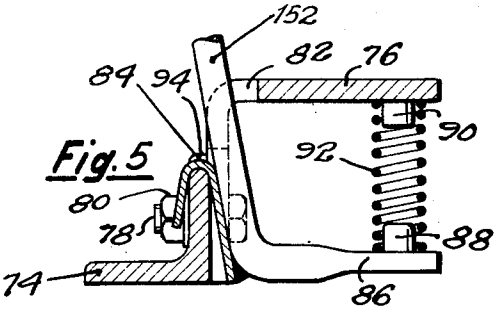


Fig. 5

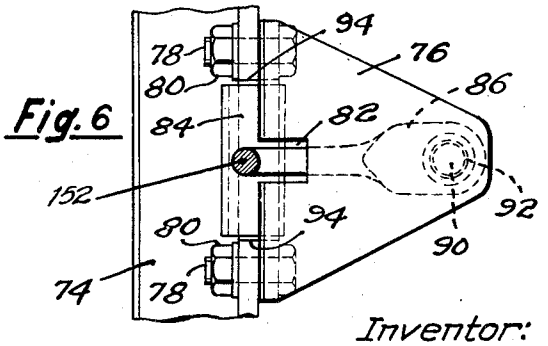


Fig. 6

Inventor:
Ernst Rogner
by

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CARRIER FOR BAND-TENSIONING PULLEYS

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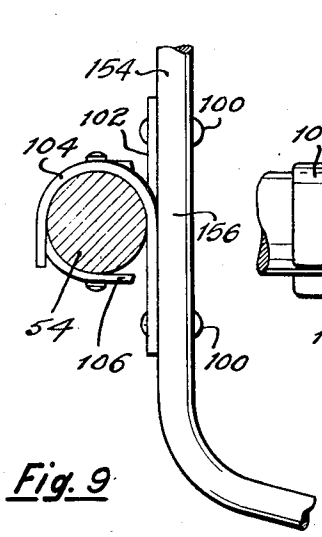


Fig. 9

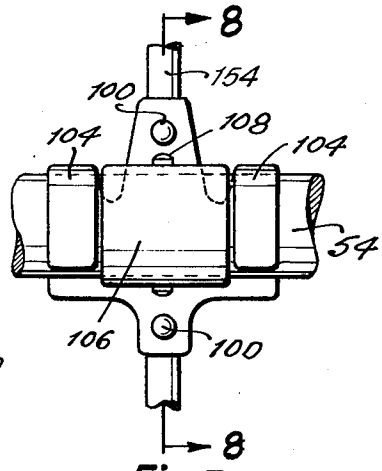


Fig. 7

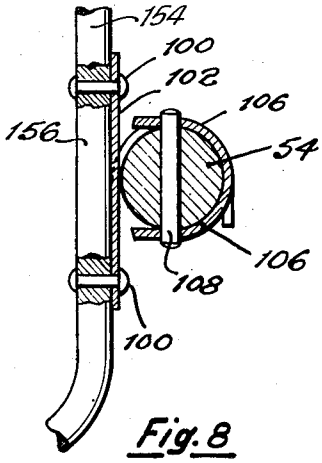


Fig. 8

Inventor:
Erich Rogner
By Marshall Sherman & Gast

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CARRIER FOR BAND-TENSIONING PULLEYS

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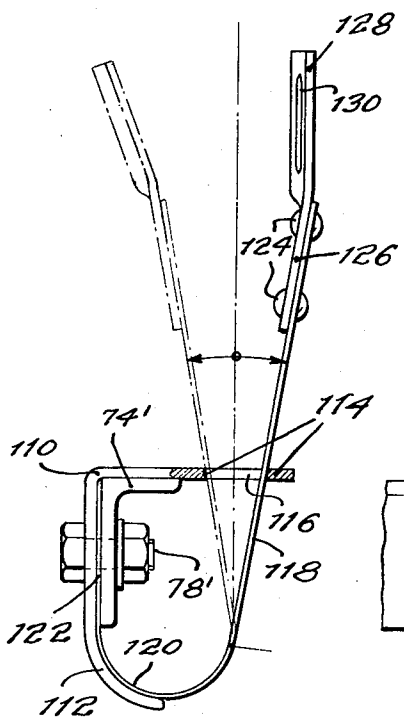


Fig. 10

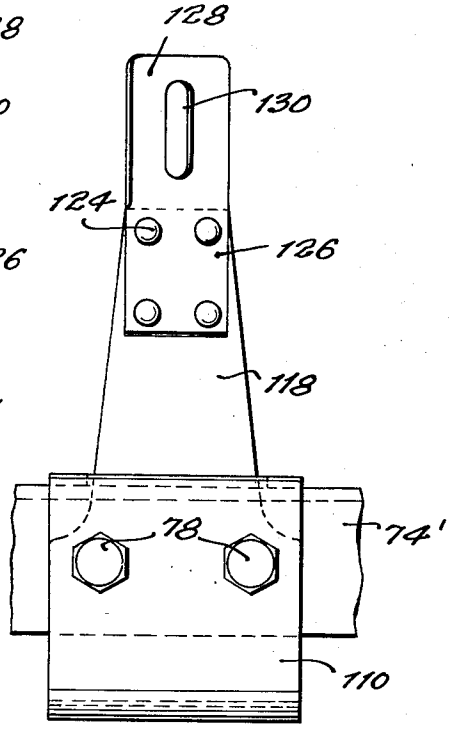


Fig. 11

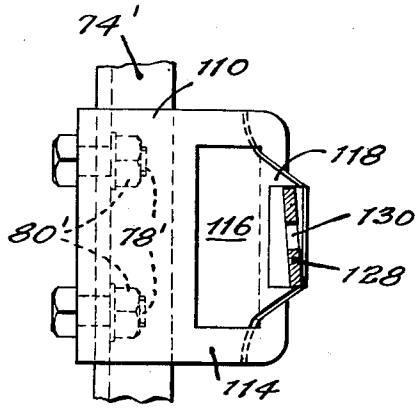


Fig. 12

Inventor:
Ernst Rogner
by Michael Stiles
Agent

Patented Oct. 26, 1954

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UNITED STATES PATENT OFFICE

2,692,474

CARRIER FOR BAND-TENSIONING PULLEYS

Ernst Rogner, Stuttgart-Bad Cannstatt, Germany, assignor to SKF Kugellagerfabriken Gesellschaft mit beschraenkter Haftung, Schweinfurt, Germany, a limited liability company

Application October 26, 1950, Serial No. 192,184

9 Claims. (Cl. 57—105)

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The present invention relates to a device for guiding and tensioning a band, more particularly in textile machines.

It is an object of the present invention to render the impacts very small to which the carrier of the pulley guiding the band is subjected when the band is caught.

It is another object of the present invention to reduce the kinetic energy of the carrier in catching the band.

It is a still further object of the present invention to reduce the rocking motion of the carrier.

It is still another object of the present invention to provide the limiting stops for the rocking motion of the carrier at the support of the same.

It is still another object of the present invention to define the position of the carrier in the longitudinal direction of the machine.

The invention comprises in its broadest aspect a pulley for guiding the band, an elongated carrier member having a resilient portion, first attaching means attaching the pulley to one end of the elongated carrier member rotatably relative to the same, a support member, second attaching means attaching the elongated carrier member in the region of the other end thereof to the support member turnably about an axis being parallel to the axis of turning of the pulley, and tensioning means permanently tending to turn the elongated carrier member together with the pulley about the second attaching means relative to the support member.

Preferably a weight acts on the resilient carrying member for moving the same into band-tensioning position.

In an alternative embodiment of the present invention resilient means are arranged between the support and the carrying member for moving the same into band-tensioning position.

According to certain embodiments of the present invention the support has a circular cross-section and a stirrup connected to the carrier member has prongs embracing the circular support.

In one embodiment of the present invention the support having a circular cross-section is provided with two holes being parallel to each other and in axial alignment and a stirrup-like member having ends arranged in the hole embraces with its mid-portion the carrier member while a helical spring wound around the support has an end acting upon the stirrup-like member and the carrier member so as to move the same into band-tensioning position.

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In a preferred embodiment of the present invention the pulley is connected to a U-shaped strip by means of a bevelled intermediate portion connected with the smaller end face thereof to one end of the strip so that the ends of the U-shaped strip delimit wedge-formed spaces for catching the band.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

Fig. 1 is a side elevation partly in section of a first embodiment of a carrier for the tensioning pulley;

Fig. 2 is a plan view partly in section of the middle portion of the device shown in Fig. 1;

Fig. 3 is a side elevation partly in section of another embodiment of the carrier, only the lower part of the same being shown;

Fig. 4 is a plan view partly in section of the device shown in Fig. 3;

Figs. 5 and 6 are a side elevation and a plan view, respectively, partly in section, of a further embodiment of a carrier for the band-tensioning pulley, only the lower part of the carrier being shown;

Fig. 7 is a front elevation of a still further embodiment of a carrier for the band-tensioning pulley, only the middle portion of the carrier being shown;

Fig. 8 is a section along the line 8—8 of Fig. 7;

Fig. 9 is a side elevation partly in section of the device shown in Fig. 7; and

Figs. 10, 11 and 12 are, respectively, a side elevation partly in section, a front elevation, and a plan view partly in section, of a still further embodiment of the present invention.

Referring first to Fig. 1, it will be seen that on one end of the carrier rod 26 the holder 18 is mounted which in turn rotatably carries the tensioning pulley 12 about which the band 10 passes. This carrier rod 26 is a relatively thin circular rod having a mid portion 50 passing through a recess 52 in a rod-shaped support 54 forming a stationary part of the machine. A stirrup-like member 56 holds the mid portion 50 of the carrier rod 26 in the recess 52 and is provided with two prongs 58 embracing the support 54 (see also Fig. 2). The upper portion of the carrier rod between holder 18 and support 54 is resilient for vibration in the plane of turning of the carrier

line. The lower end 60 of the carrier rod 26 carries a preferably adjustable weight 62 which acts on the carrier 26 so that the pulley 12 is acted upon by the holder 18 in a direction tensioning the band 10.

The operation of this device is as follows:

Small movements of the rod-like carrier 26 due to the motion of the band 10 are taken up by the upper portion of the carrier owing to the elasticity thereof, without transferring them to the stirrup 56 and the support 54. In consequence thereof, a frictional movement of the prongs 58 of the stirrup 56 with respect to the support 54 is avoided. It should be understood that this arrangement is rendered possible by the small range of the carriers tilting motion limited by catching of the band slipped off the pulley of the band 10 because the kinetic energy of the pulley 12 to be taken up by the carrier rod 26 is relatively small. Further more as the carrier rod 26 makes only small angular or rocking movements the recess 52 in the support 54 can be kept small so that the width thereof only slightly exceeds the diameter of the carrier rod 26. In this way the position of the carrier rod 26 is secured against being wrongly mounted and changes during the operation of the machine are prevented. The inclination of the tensioning pulley 12 is adjusted according to the requirement of the machine and the carrier 26 is connected to the support 54 by means of the stirrup 56. In consequence thereof the carrier rod 26 can be easily exchanged.

Referring now to Figs. 3 and 4 of the drawing the upper part of a carrier is designed in the same manner as shown in Fig. 1. In the embodiment shown in Fig. 3, the carrier 150 ends substantially level with the support 54 to which it is connected by a substantially horizontal stirrup-like member 64 having bent-off ends 66 arranged in conical holes or recesses 68 provided parallel to each other in the upper side of the support 54 substantially at right angles to the axis thereof. The size and shape of the holes 68 define the limits of the angular deviations of the carrier 150. In order to keep the band tensioned a helical spring 70 is arranged on the support 54 having a circular cross section and embraces with one end 72 thereof the carrier 150. By this arrangement the end 66 of the stirrup 64 moves within the holes or recesses 68 only at larger rocking movements of the carrier 150 whereas smaller movements are taken up by the resilient part of the carrier 150 (not shown in Figs. 3 and 6).

The operation of this device is substantially the same as that of the device shown in Figs. 1 and 2.

Referring now to Figs. 5 and 6, the machine includes a support shaped as a stationary angle iron 74 to which is connected a bracket 76 by means of screw bolts 78 and nuts 80. The bracket 76 has a recess 82 at the mid portion of the arm thereof which is secured to the angle iron 74 for accommodation of the lower part of a carrier 152. Since this part is inclined to the vertical a substantially U-shaped member 84 is arranged between the lower part of the carrier 152 and vertical portion of the angle iron 74. The lower end 86 of the carrier 152 is bent off and in a substantially horizontal position. The latter is provided with a short cylindrical member 88 arranged opposite to a corresponding cylindrical member 90 arranged at the upper leg of the bracket 76. A helical spring 92 is interposed between the end 86 of the carrier 152 and the upper leg of the bracket 76 and held in position by the cylindrical members 88 and 90 which have a slightly smaller diameter than the helix of the spring 92. The vertical leg of the angle iron 74 is provided at its upper end with a shoulder 94 the sides of which serve as abutments for limiting the angular or rocking movements of the carrier 152 by abutting, respectively, against the member 84.

The operation of this device is substantially the same as that of the previously described embodiments. The spring 92 serves for maintaining the tension of the band (not shown) by acting on the carrier 152 carrying the tensioning pulley (not shown in Figs. 5 and 6).

Referring now to the embodiment shown in Figs. 7, 8 and 9, the mid portion 156 of a carrier 154 is connected by means of rivets 100 to a member 102 having lateral prongs 104 embracing the supporting rod 54. Between the prongs 104 is arranged an intermediate member 106 which is secured to the support 54 by means of a pin 108. The lower end of the carrier 154 carries a weight (not shown) similar to the weight 62 in Fig. 1.

The operation of this device is substantially the same as that of the embodiments shown in the other figures except that the member 102 limits the angular or rocking movements of the carrier 154 by striking against the intermediate member 106.

Referring now to Figs. 10 to 12, a support shaped as an angle iron 74' is connected by means of screw bolts 78' and nuts 80' to a bracket-like member 110 having a curved lower end 112 and a substantially horizontal upper leg 114 provided with a substantially rectangular hole 116 the opposite sides of which parallel to the angle iron 74' form abutments for a carrier 118 consisting of bent steel connected by an elastic portion 120 acting as a spring, and a straight leg 122 to the bracket 110 and the angle iron 74'. The leg 122 is provided with two holes for the screw bolts 78'. Thus it will be seen that the elastic carrier 118 is firmly held between the bracket 110 and the angle iron 74' if the nuts 80' on the screw bolt 78' are tightened. The upper end of the carrier 118 is riveted by means of rivets 124 to a plate-like member 126 having an extension 128 which is angularly displaced with respect to the plate 126 and is provided with an oblong hole 130 for attachment of the holder (not shown) of the tensioning pulley (not shown).

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of holders for tensioning pulleys differing from the types described above.

While I have illustrated and described the invention as embodied in a holder for tensioning pulleys in textile machines, I do not intend to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of my invention.

Without further analysis, the foregoing will so fully reveal the gist of my invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention, and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

It is to be understood that the term "band" as

used in the specification and claims, includes other forms of power transmission means, as e. g. belts, tapes and the like.

What I claim as new and desire to secure by Letters Patent is:

1. A band tensioning and guiding device, comprising, in combination, a support member; an elongated carrier member forming a double-arm lever pivotally mounted intermediate its ends on said support member for turning about a first axis, the portion of said carrier member on one side of said first axis constituting one arm of said double-arm lever and being resilient for vibration in the plane of turning of said carrier member, and the remaining portion of said carrier on the other side of said first axis constituting the other arm of said double-arm lever; pulley means mounted on said elongated carrier member at the free end of said resilient portion thereof for rotation about a second axis substantially parallel to said first axis, said pulley means being adapted to engage a moving band for guiding the same; and urging means on said remaining portion of said elongated carrier member tending to turn said carrier member about said first axis so as to urge said pulley means in the direction of turning for tensioning a band engaged by said pulley means, whereby said resilient portion of said carrier member carrying said pulley means is free to slightly vibrate due to slight changes in tension of the engaged band without interference by said urging means which does not similarly vibrate due to the inherent inertia of said urging means and said remaining portion of said carrier member.

2. A band tensioning and guiding device, comprising, in combination, a support member; an elongated carrier member forming a double-arm lever pivotally mounted intermediate its ends on said support member for turning about a first axis, the portion of said carrier member on one side of said first axis constituting one arm of said double-arm lever and being resilient for vibration in the plane of turning of said carrier member, and the remaining portion of said carrier member on the other side of said first axis constituting the other arm of said double-arm lever, said resilient portion having a leading side facing in one direction of turning of said carrier member and a trailing side facing in the opposite direction; attaching means on said carrier member connected thereto in the region of the free end of said resilient portion thereof and extending laterally thereof on said trailing side; pulley means arranged on said trailing side of said carrier member mounted on said attaching means for rotation about a second axis substantially parallel to said first axis, said pulley means being adapted to engage a moving band for guiding the same; and urging means on said remaining portion of said elongated carrier member tending to turn said carrier member about said first axis so as to urge said pulley means in the direction of turning for tensioning a band engaged by said pulley means, whereby said resilient portion of said carrier member carrying said pulley means is free to slightly vibrate due to slight changes in tension of the engaged band without interference by said urging means which does not similarly vibrate due to the inherent inertia of said urging means and said remaining portion of said carrier member.

3. A band tensioning and guiding device, comprising, in combination, a support member; an elongated carrier member forming a double-arm lever pivotally mounted intermediate its ends on said support member for turning about a first axis, the portion of said carrier member on one side of said first axis constituting one arm of said double-arm lever and being resilient for vibration in the plane of turning of said carrier member, and the remaining portion of said carrier member on the other side of said first axis constituting the other arm of said double-arm lever, said resilient portion having a leading side facing in one direction of turning of said carrier member and a trailing side facing in the opposite direction, said remaining portion extending laterally of said carrier member on the same side as said leading side; attaching means on said carrier member connected thereto in the region of the free end of said resilient portion thereof and extending laterally thereof on said trailing side; pulley means arranged on said trailing side of said carrier member mounted on said attaching means for rotation about a second axis substantially parallel to said first axis, said pulley means being adapted to engage a moving band for guiding the same; and urging means on said remaining portion of said elongated carrier member tending to turn said carrier member about said first axis so as to urge said pulley means in the direction of turning for tensioning a band engaged by said pulley means, whereby said resilient portion of said carrier member carrying said pulley means is free to slightly vibrate due to slight changes in tension of the engaged band without interference by said urging means which does not similarly vibrate due to the inherent inertia of said urging means and said remaining portion of said carrier member.

4. A band tensioning and guiding device, comprising, in combination, a support member; an elongated carrier member forming a double-arm lever pivotally mounted intermediate its ends on said support member for turning about a first axis, the portion of said carrier member on one side of said first axis constituting one arm of said double-arm lever and being resilient for vibration in the plane of turning of said carrier member, and the remaining portion of said carrier member on the other side of said first axis constituting the other arm of said double-arm lever, said resilient portion having a leading side facing in one direction of turning of said carrier member and a trailing side facing in the opposite direction; a U-shaped attaching member having a pair of leg portions and a mid-portion connecting said leg portions, said attaching member being connected at its mid-portion to said carrier member in the region of the free end of said resilient portion thereof and extending laterally thereof on said trailing side, the free end of one of said leg portions being bent inwardly to form a band-catching member; pulley means arranged on said trailing side of said carrier member mounted between said legs of said attaching member and on the other of said legs thereof for rotation about a second axis substantially parallel to said first axis, said pulley means being adapted to engage a moving band for guiding the same; and urging means on said remaining portion of said elongated carrier member tending to turn said carrier member about said first axis so as to urge said pulley means in the direction of turning for tensioning a band engaged by said pulley means, whereby said resilient portion of said carrier member carrying said pulley means is free to slightly vibrate due to

slight changes in tension of the engaged band without interference by said urging means which does not similarly vibrate due to the inherent inertia of said urging means and said remaining portion of said carrier member.

5. A band tensioning and guiding device, comprising, in combination, a support member; an elongated carrier member forming a double-arm lever pivotally mounted intermediate its ends on said support for turning about a first axis, the portion of said carrier member on one side of said first axis constituting one arm of said double-arm lever and being resilient for vibration in the plane of turning of said carrier member, and the remaining portion of said carrier member on the other side of said first axis constituting the other arm of said double-arm lever, said resilient portion having a leading side facing in one direction of turning of said carrier member and a trailing side facing in the opposite direction; a U-shaped attaching member having a pair of leg portions and a mid-portion connecting said leg portions, said attaching member being connected at its mid-portion to said carrier member in the region of the free end of said resilient portion thereof and extending laterally thereof on said trailing side, the free end of one of said leg portions being bent inwardly to form a band-catching member; pulley means arranged on said trailing side of said carrier member mounted between said legs of said attaching member and on the other of said legs thereof for rotation about a second axis substantially parallel to said first axis, said pulley means being adapted to engage a moving band for guiding the same, the band-catching member being arranged between said second axis and the periphery of the pulley means nearest said carrier member; and urging means on said remaining portion of said elongated carrier member tending to turn said carrier member about said first axis so as to urge said pulley means in the direction of turning for tensioning a band engaged by said pulley means, whereby said resilient portion of said carrier member carrying said pulley means is free to slightly vibrate due to slight changes in tension of the engaged band without interference by said urging means which does not similarly vibrate due to the inherent inertia of said urging means and said remaining portion of said carrier member.

6. A band tensioning and guiding device, comprising, in combination, a support member; an elongated carrier member forming a double-arm lever pivotally mounted intermediate its ends on said support member for turning about a substantially horizontal first axis, the portion of said carrier member on one side of said first axis constituting one arm of said double-arm lever and being resilient for vibration in the plane of turning of said carrier member, and the remaining portion of said carrier member on the other side of said first axis constituting the other arm of said double-arm lever; pulley means mounted on said elongated carrier member at the free end of said resilient portion thereof for rotation about a second axis substantially parallel to said first axis, said pulley means being adapted to engage a moving band for guiding the same; and counter-weight means on said remaining portion of said elongated carrier member tending to turn said carrier member about said first axis so as to urge said pulley means in the direction of turning for tensioning a band engaged by said pulley means, whereby said resilient portion of said carrier member carrying said pulley means is free to slightly vibrate due to slight changes in tension of the engaged band without interference by said counter-weight means which does not similarly vibrate due to the inherent inertia of said counter-weight means and said remaining portion of said carrier member.

7. A band tensioning and guiding device, comprising, in combination, a support member; an elongated carrier member forming a double-arm lever pivotally mounted intermediate its ends on said support member for turning about a substantially horizontal first axis, the portion of said carrier member on one side of said first axis constituting one arm of said double-arm lever and being resilient for vibration in the plane of turning of said carrier member, and the remaining portion of said carrier member on the other side of said first axis constituting the other arm of said double-arm lever, said resilient portion having a leading side facing in one direction of turning of said carrier member and a trailing side facing in the opposite direction; a U-shaped attaching member having a pair of leg portions and a mid-portion connecting said leg portions, said attaching member being connected at its mid-portion to said carrier member in the region of the free end of said resilient portion thereof and extending laterally thereof on said trailing side, the free end of one of said leg portions being bent inwardly to form a band-catching member; pulley means arranged on said trailing side of said carrier member mounted between said legs of said attaching member and on the other of said legs thereof for rotation about a second axis substantially parallel to said first axis, said pulley means being adapted to engage a moving band for guiding the same, the band-catching member being arranged between said second axis and the periphery of the pulley means nearest said carrier member; and counter-weight means on said remaining portion of said elongated carrier member tending to turn said carrier member about said first axis so as to urge said pulley means in the direction of turning for tensioning a band engaged by said pulley means, whereby said resilient portion of said carrier member carrying said pulley means is free to slightly vibrate due to slight changes in tension of the engaged band without interference by said counter-weight means which does not similarly vibrate due to the inherent inertia of said counter-weight means and said remaining portion of said carrier member.

8. A band tensioning and guiding device, comprising, in combination, a support member; an elongated carrier member forming a double-arm lever pivotally mounted intermediate its ends on said support member for turning about a substantially horizontal first axis, the portion of said carrier member on one side of said first axis constituting one arm of said double-arm lever and being resilient for vibration in the plane of turning of said carrier member, and the remaining portions of said carrier member on the other side of said first axis being shorter than said first-mentioned portion and constituting the other arm of said double-arm lever, said resilient portion having a leading side facing in one direction of turning of said carrier member and a trailing side facing in the opposite direction; a U-shaped attaching member having a pair of leg portions and a mid-portion connecting said leg portions, said attaching member being connected

at its mid-portion to said carrier member in the region of the free end of said resilient portion thereof and extending laterally thereof on said trailing side, the free end of one of said leg portions being bent inwardly to form a band-catching member; pulley means arranged on said trailing side of said carrier member mounted between said legs of said attaching member and on the other of said legs thereof for rotation about a second axis substantially parallel to said first axis, said pulley means being adapted to engage a moving band for guiding the same, the band-catching member being arranged between said second axis and the periphery of the pulley means nearest said carrier member; and counter-weight means on said remaining portion of said elongated carrier member tending to turn said carrier member about said first axis so as to urge said pulley means in the direction of turning for tensioning a band engaged by said pulley means, whereby said resilient portion of said carrier member carrying said pulley means is free to slightly vibrate due to slight changes in tension of the engaged band without interference by said counter-weight means which does not similarly vibrate due to the inherent inertia of said counter-weight means and said remaining portion of said carrier member.

9. A band tensioning and guiding device, comprising, in combination, a support member; an elongated carrier member forming a double-arm lever pivotally mounted intermediate its ends on said support member for turning about a substantially horizontal first axis, the portion of said carrier member on one side of said first axis constituting one arm of said double-arm lever and being resilient for vibration in the plane of turning of said carrier member, and the remaining portion of said carrier member on the other side of said first axis constituting the other arm of said double-arm lever, said resilient portion having a leading side facing in one direction of turning of said carrier member and a trailing side facing in the opposite direction; a U-shaped attaching member having a pair of leg portions and a mid-portion connecting said leg portions, said attaching member being connected at its mid-portion to said carrier member in the region of the free end of said resilient portion thereof and extending laterally thereof on said trailing side, the free end of one of said leg portions being bent inwardly to form a band-catching member; pulley means arranged on said trailing side of said carrier member mounted between said legs of said attaching member on the other of said legs thereof for rotation about a second axis substantially parallel to said first axis, said pulley means being adapted to engage a moving band for guiding the same, the band-catching member being arranged between said second axis and the periphery of the pulley means nearest said carrier member; counter-weight means on said remaining portion of said elongated carrier member tending to turn said carrier member about said first axis so as to urge said pulley means in the direction of turning for tensioning a band engaged by said pulley means; and stop means for limiting the turning of said carrier member about said first axis relative to said support member, whereby said resilient portion of said carrier member carrying said pulley means is free to slightly vibrate due to slight changes in tension of the engaged band without interference by said counter-weight means which does not similarly vibrate due to the inherent inertia of said counter-weight means and said remaining portion of said carrier member.

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